The Leverage of Technology: The Evolution of Armed Helicopters in Vietnam

FEW MACHINES exemplify 20th-century technology like the helicopter. The complexity of a combat helicopter is phenomenal. Each airframe consists of thousands of parts that are machine-milled to precise specifications and operate in unison with little margin for error. To build a machine capable of sustained flight with rotating wings is remarkable in itself; to then use the machine in highly choreographed military operations ranks among the great accomplishments in modern warfare.

In the 20th century, the U.S. military embraced technology as a means of exploiting an advantage over enemy forces. In the Vietnam war, for example, the challenges of fighting a technologically inferior, unconventional enemy over a period of years provided a proving ground for technology-based weapons. Propelled by the urgency of war, the helicopter emerged as a major component of U.S. warfighting doctrine.

Introducing the helicopter as a means of leveraging technology shook the force structure of the U.S. Army to its foundation. Within the context of this transformation, the evolution of the armed helicopter is a revealing story.

The Backdrop

Following the Viet Cong (VC) capture of Phuoc Vinh in September 1961, President John F. Kennedy sent Army Chief of Staff Maxwell Taylor to Saigon to evaluate the situation. Taylor observed that the Army of the Republic of Vietnam (ARVN) suffered from inadequate mobility. Mountains and jungle in the north-central regions and a maze of rivers in the Mekong Delta severely retarded the country's road infrastructure. The Kennedy administration moved quickly to overcome the problem, believing that providing ARVN forces with U.S.-piloted helicopters would shift the balance of the conflict. The arrival of 32 Army H-21s in Saigon on 12 December 1961 signaled the beginning of a new era in military aviation. The tempo picked up in April 1962 when the helicopter carrier USS *Princeton* began launching Marine Corps H-34 helicopters on missions into South Vietnam.[1] By the end of September 1964, the CH-21 had been supplanted with 250 UH-1s and 9 CH-37s.[2]

Meanwhile, Secretary of Defense Robert McNamara directed the Army to evaluate its aviation requirements. Following an introspective study, the Howze Board released a report in August 1962 that called for the establishment of the 11th Air Assault Division, which eventually merged with the 2d Infantry Division and was renamed the 1st Cavalry Division (Airmobile).[3] General Hamilton Howze based his vision for an airmobile division on large-scale conventional war planning, not the counterinsurgency role found in Vietnam. Howze saw the primary advantages of the airmobile forces as mobility, utility in delay operations, the ability to ambush conventional forces, and the ability to provide direct firepower.[4] The unification of helicopters and ground forces gave a single commander incredible maneuverability and firepower. For example, the 1st Cavalry arrived in Vietnam with 15,787 troops and 435 helicopters. Aircraft were divided among three battalions: the 228th received 48 CH-47s; the 227th and

229th each received 60 UH-1D "slicks" and 12 UH-1B gunships.[5] Howze's vision had a profound effect on operations in Vietnam.

Helicopter Technology

When the United States entered the Vietnam conflict, the helicopter was a utility vehicle of marginal importance. By the end of the war, military commanders had integrated it into practically every type of mission. Significant design improvements occurred in the early 1960s that allowed operational commanders to expand the role of helicopters, which had become sophisticated war machines capable of performing diverse missions.

The armed services entered the helicopter revolution from different perspectives. The Navy was using helicopters for search-and-rescue missions and as antisubmarine warfare (ASW) platforms. The Army and Marine Corps were using helicopters largely for transporting supplies and ammunition. The Air Force was using them sparingly for personnel transport.

The intrinsic culture of the services in 1961 affected the design features of their respective helicopters. Weapons-system acquisition strategies were oriented around large-scale, conventional warfare. The Army pursued a mobile, decentralized, integrated structure that proved ideal for its tactical requirements. As a result, the Army acquired the UH-1 to replace the CH-21 in a cavalry role to support conventional mechanized units. The Marine Corps emphasized larger assault helicopters with centralized control under an air-wing commander.[6] Consequently, the Marines moved toward the larger H-34 to provide combat mobility for a self-sufficient assault force.

The workhorse for the Army until 1963 was the Piasecki H-21. The Army purchased 334 of the dual-rotor helicopters. H-21s were powered by 1,425-horsepower (hp) radial piston engines and could carry 20 soldiers.[7] In many ways, the H-21 was the test platform for the complexities of helicopter operation in a combat environment. Originally, the H-21 was unarmed and unarmored. One shortcoming of the H-21 was that it only had one small cabin door, which slowed the deployment or recovery of troops in the landing zone (LZ).

In the 1960s, The Sikorsky H-34 was well received by militaries around the world, and eventually more than 2,300 were built. Originally designed for the Navy as an ASW platform, production models of the H-34 were outfitted with gas turbine engines in 1960. This new engine was an important steppingstone in helicopter development. The British-built Napier Gazelle turboshaft engine produced 1,450-shaft horsepower (shp) at a reduced weight and fuel flow vis-à-vis a radial piston engine.[8] The Marine Corps ordered more than 500 H-34s (which they called the HUS-1) and used the airframe for some early gunship missions and virtually all of its troop transport missions until 1968.

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In 1959, Bell Helicopter delivered the first production model of the HU-1A Iroquois to the Army. Renamed the UH-1A, the Army accepted the "Huey" because it balanced state-of-the-art technology with low maintenance and was adaptable to diverse missions. Excellent cockpit visibility combined with ample, accessible cabin space allowed pilots to spot ground threats and to maneuver in confined areas. A Lycoming T53-L-1A, 860-shp engine originally powered the UH-1As. Lycoming improved its turbo shaft engines throughout the 1960s to the extent that by 1970, it was installing 1,400-shp engines in new UH-1Es. The airframe's receptiveness to external modification was crucial to the evolution of gunship technology.

Gunship Weaponry

The union of the M-60C, 7.62-millimeter (mm) machinegun with the UH-1 airframe gave birth to the legendary Vietnam gunship. The big breakthrough was the M6 armament subsystem, which integrated four M-60C machineguns into the airframe by pairing the guns on sliding mounts on either side of the cabin. Each gun carried 1,500 rounds and could be moved through an 80-degree horizontal arch and a 95-degree vertical arch.

The Army began arming UH-1As in mid-1962 with 2.30-caliber machineguns and 2.75-inch rocket launchers. This ordinance combination outlived the war because the maneuverable guns provided excellent suppression fire, while the rockets delivered a potent knockout punch. Helicopter firepower became especially formidable when six-barreled miniguns and rockets were mounted on durable UH-1Bs.

US Army

"Viking fire team" UH-1Bs of the 121st Assault Helicopter Company on a mission near Soc Trang, Vietnam, 1964.

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When the Army upgraded to UH-1Cs in 1966, it transferred many UH-1B gunships to the Navy for use in the Mekong Delta. The Marine Corps filled three observation squadrons with Hueys in 1965, using the helicopters in a variety of roles. When armed with four forward-firing M-60s and two 19-round rocket packs, they flew escort, close air support (CAS), and forward air-controller missions.[9]

In September 1967, the first AH-1G Cobras arrived. By eliminating cabin weight, a Cobra could take on more ordnance. Furthermore, its sleek profile reduced target-aspect size and improved aerodynamic efficiency. Another enormously popular gunship concept (although short-lived) was the "Go-Go Bird." Not long after the CH-47 began operation, Boeing outfitted four of its aircraft as heavy gunships. Armed with twin 20-mm Gattling guns, 40-mm grenade launchers, and .50-caliber machine-guns, the heavy gunships were not graceful, but they boosted troop morale. From the infantryman's viewpoint, when the Go-Go Bird came, the enemy disappeared.[10] However, the aircraft were difficult to maintain as gunships and were reverted to transport duties.

Toward the end of the war, a surplus of air-to-ground helicopter weaponry was in-theater. Two examples of mature weapon technology were the M28A1 and M22 armament subsystems. Fully integrated into the AH-1G, the M28A1 turret contained a 7.62-mm Gattling gun and a 40-mm grenade launcher. When fortified positions or enemy armor were encountered, the Army used the M22 armament subsystem on UH-1Bs to deliver AGM-22B wire-guided missiles. Such diversity of weaponry had a synergistic technological advantage. In addition to giving operators potent weapons for specific threats, the M28A1 and M22 kept the enemy off balance because he never knew what ordnance to expect when he heard the telltale "wop-wop" sound of the Bell helicopter.

Tactics and Countertactics

As offensive platforms, helicopters offer several unparalleled advantages. At first glance they appear highly vulnerable, lumbering noisily along at low altitudes. However, knocking one out of the sky is not a simple task. With self-sealing fuel bladders and a little bit of armor, helicopters are highly resistant to small-caliber weapons. The helicopter is the most maneuverable of all aircraft and when operated at low altitudes, can minimize its exposure to ground weapons by hiding behind terrain and ground obstructions. The helicopter's low, slow flight allows crewmen to see the finer details of ground activity while also giving them a view of the big picture. Shooting at a helicopter from the ground invites heavy return fire.

To reduce exposure to aerial observation, the North Vietnamese Army (NVA) and VC resorted to night operations, which essentially neutralized a portion of the United States' technological edge. To regain the initiative, the United States turned to improving night-fighting tactics by mounting night-vision devices and enormous spotlights in helicopters; however, it was the tactically proficient operators who enabled technology to re-command the fight. During Operation Lejeune in April 1967,

helicopters conducted Night Hunter operations almost every evening.

Lieutenant Colonel (LTC) Fred E. Karhohs, 2d Brigade Task Force, 1st Cavalry Division (Airmobile), developed night-fighting techniques to a high degree during the Night Hunter operation and later on the coastal plains of Binh Dinh. The operations used four helicopters: one acted as a lead and flare ship, while three unlighted helicopters sought targets of opportunity. As the lead ship dropped flares, door gunners in the next two helicopters, which flew at a higher altitude and at a distance from the flares, observed the ground with starlight scopes. After spotting the enemy, the gunners fired tracers to pinpoint the target, while the fourth helicopter opened fire with 2.75-inch rockets. This four-ship strategy was an effective technique for finding and killing the enemy and denying him one of his most valuable assets—the night."[11]

Yankee ingenuity in Indochina initially had a devastating effect on communist forces. The NVA had only marginal technological warfighting tools in the early 1960s, while their Southeast Asian collaborators—the VC, Pathet Lao, and Khmer Rouge—had virtually none. The enemy used stealth, cunning, and ruthless determination to overcome its technological disadvantage.

In an NVA document captured in 1962, two items stand out as a strategy for countering helicopter operations. The document stated, "The effectiveness of heliborne tactics is greatly reduced in forested and jungle-covered mountain areas where a clear knowledge of the nature of the terrain cannot be discerned from the air, where landings are difficult, and ambushes easily employed against the landings."[12] The document also stated, "A landing right within our position is the most effective, but also subject to coming under our firepower, while a landing outside of our position, though avoiding our firepower, loses the element of surprise."[13]

The 1st Cavalry Division demonstrated the concept of airmobility in November 1965 when it engaged regiment-size concentrations of NVA in the Ia Drang valley. Helicopter scouts accurately fixed enemy locations, while transport helicopters quickly moved rifle platoons to positions on the battlefield that cut enemy lines of communication.

Applying superior technology at Ia Drang had significant repercussions on both sides. It solidified U.S. General William Westmoreland's confidence in an attrition strategy. In the words of LTC Andrew Krepinevich, "The Ia Drang valley campaign represented the successful application of the attrition strategy. Here were large enemy formations willing to go toe-to-toe with the Americans, and their big units were being smashed by the Army's firepower and high-tech mobility."[14] Conversely, while the NVA inflicted severe casualties, the battle of Ia Drang taught them to avoid direct confrontations with U.S. forces. NVA commander Colonel Nguyen Huu An recollected the instructions he gave before the battle, "When you meet the Americans, divide into many groups and attack the column from all directions and divide the column into many pieces. Move inside the column, grab them by the belt, and thus avoid casualties from the artillery and air."[15] Acknowledging that large-scale conventional operations were not a viable option, Hanoi circumvented the United States' technological advantage by redirecting its effort to guerrilla warfare.

In the early stages of helicopter troop movement, the enemy attempted to disable troop-laden aircraft with small-arms fire as they slowed and descended into the LZ. Recognizing the CH-21's vulnerability

A pilot and crew chief with the 197th Aviation Company (Armed Helicopter) check their UH-1B's weapons system, circa 1965.

US Army

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A UH-1B fires a 2.75-inch rocket in support of South Vietnamese troops.

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when landing, the Army came up with gunship escorts known as Eagle flights. These helicopters remained above the LZ where they could maintain maneuverability and observation. If the enemy attempted to disrupt the insertion, they swooped in with suppressing fire.

Later, coordinated tactics between gunships and other helicopters led to the use of color-coded teams. For example, a Pink Team normally consisted of an OH-6A, which searched at low altitudes, while an AH-1G was up high and ready to pounce. As the enemy strengthened its air defense weaponry and tactics, armament in the helicopter gunship enabled airmobility to remain a fundamental instrument of U.S. strategy over the course of the war.

As the war dragged on, the enemy narrowed the technology gap. Not only did the enemy avoid conditions where U.S. forces could leverage technology, they also developed weapons and countertactics that challenged U.S. weaponry. From 16 October 1962 through 15 March 1963, only 11 utility tactical transport helicopters were hit by enemy fire. None were lost. Ten years later in Laos, during the 2-month Operation Lam Son 719, 107 helicopters were destroyed (primarily troop-carrying slicks) and 600 were damaged.[16]

Crossing into Laos was a severe test of helicopter technology. The Army had managed to moderate the flow of supplies into South Vietnam and keep the enemy off balance. As a result, helicopters in South Vietnam typically encountered only 7.62-mm and 12.7-mm guns. However, concentrated inside Laos were 23-mm, 37-mm, and 57-mm weapons arranged in mutually supporting positions. In fact, during the February-March 1972 campaign into Laos, the Army captured approximately 2,000 crew-served weapons.

U.S. technology made a "giant leap for mankind" in the 1960s. The race to the moon and the escalated war in Vietnam accelerated innovation and solidified U.S. cultural belief in and reliance on technology. Advances in combat helicopters during the period are a perfect example of how technology can render advantages in war. Reliable, heavily armed gunship platforms allowed field commanders to seize the tactical initiative and permitted Army airmobility to go forward, despite aggressive enemy efforts to disrupt helicopter-borne troop movement. Gunships created new avenues of tactical innovation in aerial reconnaissance-in-force, such as helicopter Pink

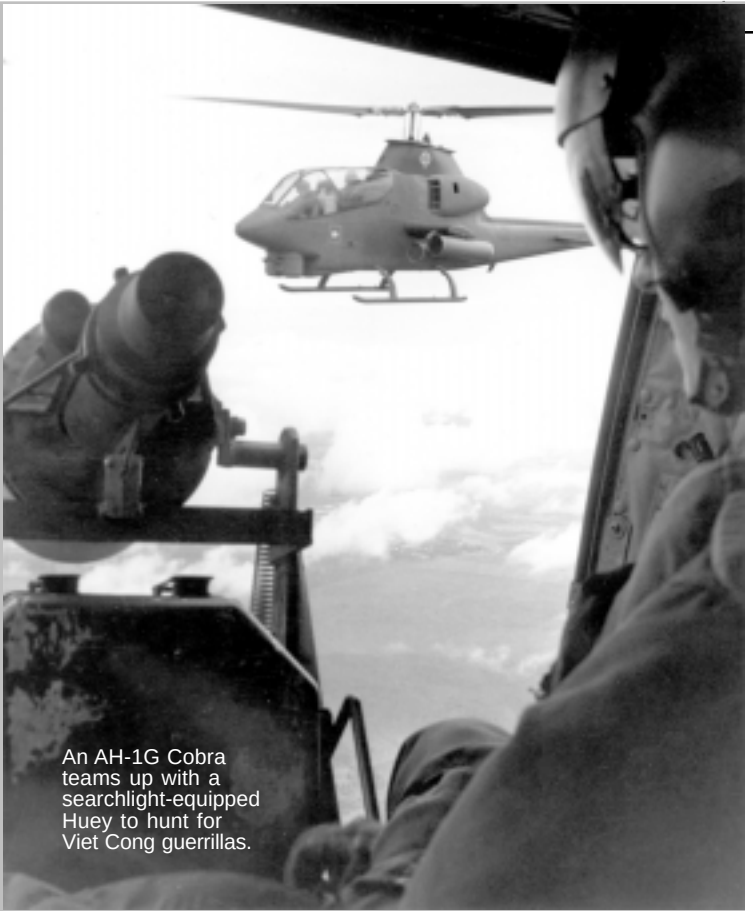
Teams. Gunships provided ground commanders with quick-reaction CAS as well as a safe means of weapon delivery when the enemy was in close combat with U.S. forces (known as "hugging") to find sanctuary from artillery or heavy air strikes.

The helicopter-gunship development stands as a warning to those who expect too much from technology. As the conflict began, the United States had a significant technological advantage and an immature doctrine, yet it converted the condition into a significant tactical advantage. Although the United States upgraded its helicopter gunships and refined doctrine as the war progressed, the leverage of technology was never as profound as it had been early in the war.

Colonel Trevor Dupuy said, "Save for the recent significant exception of strategic nuclear weapons, there have been no historical instances in which new and more lethal weapons have, of themselves, altered the conduct of war or the balance of power until they have been incorporated into a new tactical system exploiting their lethality and permitting their coordination with other weapons."[17] The bottom line is that, given time, an astute opponent will discover ways to minimize technological advantage.

As military strategist Carl von Clausewitz eloquently said, "If we desire to defeat the enemy, we must proportion our efforts to his powers of resistance. The product of two factors that cannot be separated, namely, the sum of available means and the strength of the will, expresses this. The sum of the available means may be estimated in a measure, as it depends (although not entirely) upon numbers; but the strength of volition is more difficult to determine, and can only be estimated to a certain extent by the strength of the motives. Granted we have obtained in this way an approximation to the strength of the power to be contended with, we can then take of our own means and either increase them so as to obtain a preponderance, or in case we have not the resources to effect this, then do our best by increasing our means as far as possible. But the adversary does the same; therefore, there is a new mutual enhancement, which in pure conception, must create a fresh effort towards an extreme."[18] ***MR***

US Army



An AH-1G Cobra teams up with a searchlight-equipped Huey to hunt for Viet Cong guerrillas.

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NOTES

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